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Edited by Gregory K. Ingram and Daphne A. Kenyon

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Is Location Fate? Distributional Aspects of Schooling

Eric A. Hanushek

The focus of this chapter is how location interacts with schooling opportunity. This topic is found at the intersection of a number of extensive literatures covering much more territory than can be addressed here. While the chapter does not explore these separate areas in depth, it is important to point out how these themes fit together. It is also important to identify the strengths and weaknesses of the various parts of the current research.

It is difficult to enter into most of the larger policy debates of the United States without discussing the importance of developing the human capital of American youth. Indeed, it almost seems trite to say that the country's future depends on the schooling and skills of the next generations. But while this is a commonly repeated view, neither the importance of this task nor the nature of the challenge appears to be fully understood.

Thus, this chapter begins with an overview of human capital and economic outcomes. The perspective here is that the specific issues surrounding the measurement of human capital have received too little attention. Frequently, human capital and schooling are viewed as synonyms, and school attainment, or the amount of schooling completed by individuals, becomes both a direct measure of human capital and an object of policy deliberations. This complacency with measuring human capital is unfortunate and leads to ignoring some of its key aspects, especially with regard to location and distribution.

The perspective developed here focuses on the crucial role of cognitive skills, or achievement. Cognitive skills, rather than mere school attainment, are powerfully related to individual earnings, to the distribution of income, and, most important, to economic growth. Realizing the magnitude of these relationships

is essential to understanding both the challenges and the opportunities facing the United States.

Even though this chapter is motivated by locational patterns and how these patterns fit into the distribution of economic outcomes, much of what follows is not based directly on evidence that is grounded in location. There is a reason for this: much of the relevant data about educational outcomes and about factors that influence these outcomes is not consistently provided by location but by race. As a result, the discussion, particularly when talking about education policies, tends to move back and forth between location, race, and ethnicity.[1] This varying focus, however, does not unduly distort either the overall discussion or policy deliberations, because location and opportunity are so thoroughly tied up with racial distribution. Indeed, many public discussions tend to address issues related to central cities and minorities together. As discussed here, the concentration of minority populations and students, particularly in the urban centers in the eastern half of the United States, lends support to this perspective.

Place-based policy considerations take on some new dimensions when the broader aspects of human capital are brought into the conversation. From this grounding, it is possible to get a better understanding of the role that improved schooling can play and how it interacts with location. Because schooling is locally provided, location fits directly into the provision of a quality education. Clearly, location-based policies are going to remain important into the future.

The School Quality Imperative

Research related to schooling and human capital has followed two quite separate strands. The first, and the oldest, looks at how human capital affects economic outcomes. This well-known line of work relates measures of human capital to individual earnings, aggregate productivity and growth, and the like. The second essentially looks at the other end of things: how do schooling and other factors affect the human capital of individuals? This work, often referred to as the analysis of education production functions, considers how various aspects of schools affect student outcomes, which may be generally thought of as the skills and knowledge that go into human capital.

The separation of these lines of research and the contrast between them is an important part of the story. The long-standing development of both individual earnings determination and aggregate growth was strongly affected by the early measurement of human capital that focused on school attainment. This common

1. Throughout this chapter, the focus is on black and Hispanic students, sometimes referred to collectively as minority students or at times just as representing race divisions. These students also have an above-average incidence of poverty, highlighting the fact that economically disadvantaged students are disproportionately black and Hispanic and making it possible to interpret minority status as a partial proxy of poverty.

approach, convenient for both theoretical and empirical analyses, led to some unfortunate distortions.

We now know a considerable amount about the economic outcomes that are related to human capital. The largest set of studies considers individual earnings functions, but there are also the aggregate impacts on the economy.

This section focuses on the impact of human capital on economic outcomes, but it recenters the conversation to deal with cognitive skills—a direct measure of human capital. The empirical research on the relationship between cognitive skills and economic outcomes provides a starting point for understanding how distribution enters into economic results.

INDIVIDUAL EARNINGS

The contributions of Jacob Mincer (1970, 1974) were especially important in setting the course of empirical work on the cognitive skills–economic outcomes relationship. A central idea in the critique of early human capital theories was that human capital was inherently an elusive concept that lacked any satisfactory measurement. Arguing that differences in earnings, for example, were caused by skill or human capital differences suggested that the measurement of human capital could come from observed wage differences, but this turned it into an entirely tautological statement.

Mincer (1970) observed that a primary motivation for schooling was developing the general skills of individuals and, therefore, that it made sense to measure human capital by the amount of schooling completed by individuals. Importantly, school attainment was frequently measured and reported in both censuses and surveys. Mincer (1974) followed this with analysis of how wage differentials could be significantly explained by school attainment and, in a more nuanced form, by on-the-job training investments.

Owing in large part to the power of Mincer's analysis, schooling became virtually synonymous with the measurement of human capital. Indeed, even the form of the earnings determination model followed Mincer's early work. In common specifications,

$$(1) \qquad \ln Y_i = \alpha_0 + rS_i + \alpha_1 Exper_i + \alpha_2 Exper_i^2 + X\beta + \varepsilon_i$$

where Y_i = earnings of individual i;
S_i = school attainment;
$Exper_i$ = potential labor market experience;[2]
X_i = a vector of other measured influences on earnings;
ε_i = a random error; and
α_0, r, α_1, α_2, and β are parameters to be estimated.

2. Common empirical specification measures *Exper* by age or time out of the normal completion of schooling. The ubiquitous use of a quadratic form of experience relates both to Mincer's simple investment models and to the empirical pattern of age-earnings variations.

This general insight about the role of schooling was widely accepted and has dictated the empirical approach of a vast majority of analyses in labor economics. For example, the Mincer earnings function has become the generic model of wage determination and has been replicated in over 100 separate countries (Psacharopoulos and Patrinos 2004).

In less common work, consideration has been given to differences in skills for people with the same levels of schooling. It is much less common largely because of the general lack of information about any skill differences. When available, however, the most common estimation begins with a standard Mincer earnings model, which is augmented by a measure of cognitive skills (*CS*), such as the following:

$$(2) \qquad \ln Y_i = \alpha_0 + rS_i + \alpha_1 Exper_i + \alpha_2 Exper_i^2 + \phi CS_i + \varepsilon_i$$

When cognitive skills are standardized to mean zero and a standard deviation of one, ϕ is interpreted simply as the percentage increase in annual earnings that can be attributable to a one-standard-deviation increase in achievement. This understates the full impact of achievement to the extent that higher achievement leads to higher levels of schooling, but that is generally not considered.[3]

Table 2.1 presents estimates from alternative recent analyses of returns to cognitive skills. While many data sets have earnings and schooling data, relatively few also contain information on achievement. Thus, the samples tend to be specialized and to have relatively constrained age ranges. The point estimates range from 0.1 to 0.2. In other words, one standard deviation of achievement equates to 10–20 percent higher incomes throughout the individual's work life.

Moreover, these estimates are lower bounds on the potential effects of skills on individual incomes. These estimates come predominantly from looking at early career earnings, but Hanushek and colleagues (2013) show that the returns to cognitive skills grow by 30 percent for prime aged (35–55) workers.

This formulation, however, is peculiar in that it treats skills as something developed outside of school. In fact, some analyses have taken measures of cognitive skills to be an indication of fixed abilities in an effort to circumvent ability bias in the estimation of the return to investment in schooling.[4] But both this view and the general formulation of the Mincer model have the problem of bypassing most of the policy discussions about schools and education. The debate about schools centers on quality and on what students are learning.

This issue is in reality part of a larger analytical question about how to interpret this formulation. In a different branch of research, a vast amount of work

3. The work of Murnane and colleagues (2000) is an exception that traces through the indirect effects. See also the discussion of the form of estimation in Hanushek and Zhang (2009). For recent work comparing returns across countries, see Hanushek et al. (2013).

4. See the discussion in Card (1999).

Table 2.1
Labor Market Returns to Cognitive Skills

	Data Source	Age Sample	Return to Cognitive Skills
Mulligan (1999)	NLSY[a]		0.11
Murnane et al. (2000)	HSB[b] and NLS72[c]	27, 31	0.10–0.15
Lazear (2003)	NELS88[d]		0.12
Hanushek and Zhang (2009)	IALS[e]	16–65	0.20
Chetty, Friedman, Hilger, et al. (2011)	STAR[f]	25–27	0.18
Hanushek and Woessmann (2012)	IPUMS[g]	25–65	0.14

[a]National Longitudinal Survey of Youth.
[b]High School and Beyond.
[c]National Longitudinal Survey of the High School Class of 1972.
[d]National Education Longitudinal Study of 1988.
[e]International Adult Literacy Survey.
[f]Project STAR.
[g]2000 Census, IPUMS-USA (Integrated Public Use Microdata Series).
Note: Each estimated return comes from separate estimation of a Mincer earnings function that adds an achievement measure in units of standard deviations. Thus, the return is interpreted as the proportionate difference in annual earnings from a difference in cognitive skills of one standard deviation.
Source: Hanushek (2011).

has delved into "educational production functions." This work has considered the determinants of skills, typically measured by achievement tests.[5] Thus, it has focused on how achievement (A) is related to school inputs (R) and the overall quality of schools (q), families (F), other factors such as neighborhoods, peers, or general institutional structure (Z), and a stochastic element (ν):

$$(3) \qquad A = \lambda F + \phi(qR) + \alpha Z + \nu$$

Seen from this perspective, schooling is one of a variety of influences on achievement, or cognitive skills. This more general way to think about skills provides a focus for the discussion later in this chapter on schooling issues and on differences in achievement. Considering the various influences on achievement becomes particularly important when put into the larger context of aggregate impacts of human capital and skills.

AGGREGATE GROWTH

The second place where human capital considerations and schooling has been important is in relation to aggregate growth.

5. See, for example, the general discussion in Hanushek (2002).

In the late 1980s and early 1990s, empirical macroeconomists turned to attempts to explain differences in growth rates around the world. Following the initial work of Barro (1991), hundreds of separate studies—typically cross-sectional regressions—pursued the question of what factors determined the very large observed differences. The widely different approaches tested a variety of economic and political explanations, although the modeling invariably incorporated some measure of human capital.

Typically, growth rates (g) are a direct function of human capital (H), a vector of other factors (X), and a stochastic element (ε), as in

$$g = rH + X\beta + \varepsilon \tag{4}$$

where r and β are unknown parameters to be estimated. The related empirical analysis employs cross-country data in order to estimate the impact of the different factors on growth.[6]

From very early on, a number of reviews and critiques of empirical growth modeling assessed and interpreted this work. The critiques examined a variety of aspects of the work, including the sensitivity of the analysis to the particular specification (e.g., Levine and Renelt 1992). They also emphasized basic identification issues and the endogeneity of many of the factors common to the modeling (e.g., Bils and Klenow 2000).

In both the analysis and the critiques, much of the attention focused on the form of the growth model estimated, including the range of factors included, and the possibility of omitted factors that would bias the results. Little attention was given to measurement issues surrounding human capital.

When growth modeling looked for a measure of human capital, it was natural to think of measures of school attainment, building on the prior labor market analyses of Mincer.[7] This initial growth work simply substituted S for human capital in equation (4) and estimated the growth relationship directly.[8]

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6. A detailed discussion of this growth model and of variants of it can be found in Hanushek and Woessmann (2008).

7. Initially, researchers even thinking about measuring human capital by school attainment faced data shortcomings, but data construction by Barro and Lee (1993) provided comparable data on school attainment, which allowed international growth work to look at the implications of human capital. There were some concerns about the accuracy of the data series, leading to alternative developments (Cohen and Soto 2007) and to further refinements by Barro and Lee (2010).

8. A variety of issues have consumed much of the empirical growth analysis. At the top of the list is whether equation (1) should be modeled in the form of growth rates of income as the dependent variable, or whether it should be modeled in terms of the level of income. The former approach is generally identified as an endogenous growth model (e.g., Romer 1990), while the latter is typically thought of as a neoclassical growth model (e.g., Mankiw, Romer, and Weil 1992). The distinction has received a substantial amount of theoretical attention,

Fundamentally, however, using school attainment as a measure of human capital in an international setting presents huge difficulties. In comparing human capital across countries, it is necessary to assume that schools are imparting the same amount of learning per year in all countries. In other words, one must assume that a year of school in Japan has the same value in terms of skills as a year of school in South Africa. In general, this is implausible.

A second problem with using this measure of human capital, as pointed out previously, is that it presumes schooling is the only source of human capital and skills. Yet a variety of policies promoted by the World Bank and other development agencies emphasize improving health and nutrition as a way of developing human capital. These efforts reflect a variety of analyses of various health issues relative to learning, including poor nutrition (Bloom, Canning, and Jamison 2004) and worms in schoolchildren (Miguel and Kremer 2004). Others have shown a direct connection between health and learning (Bundy 2005; Gomes-Neto et al. 1997).

Much of the empirical analysis of production functions has been developed within individual countries and estimated with cross-sectional data or panel data for individuals. This work has concentrated on how school resources and other factors influence student outcomes (Hanushek 2003). However, as reviewed in Hanushek and Woessmann (2011a), a substantial body of work, in which differences in schools and other factors are related to cross-country differences in achievement, has recently developed.

The analysis of cross-country skill differences has been made possible by the expansion of international assessments of math and science (see the description in Hanushek and Woessmann 2011a). These assessments provide a common metric for measuring skill differences across countries, and they provide a method for directly testing the approaches to modeling growth, as found in equation (4).[9] Hanushek and Woessmann (2012) showed that the achievement of the population is closely related to cognitive skills as measured by international math and science assessments.

The fundamental idea is that skills as measured by achievement, A, can be used as a direct indicator of the human capital of a country, as described in equation (4). In addition, as described in equation (3), schooling is just one influence on the skills of individuals in different countries. Unless the other influences are orthogonal to the level of schooling, S, the growth model that relies only on S as a measure of human capital will not provide consistent estimates of how human capital enters into growth.

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although little empirical work has attempted to provide evidence on the specific form used (see Hanushek and Woessmann 2008).

9. This method of testing the approaches to modeling growth as a function of international assessments of skill differences was introduced in Hanushek and Kimko (2000). It was extended in Hanushek and Woessmann (2008) and a variety of other studies identified there.

Table 2.2
Human Capital and Long-Run Economic Growth, 1960–2000

	(1)	(2)	(3)
Cognitive skills		2.015	1.980
		(10.68)	*(9.12)*
Years of schooling, 1960	0.369		0.026
	(3.23)		*(0.34)*
GDP per capita, 1960	–0.379	–0.287	–0.302
	(4.24)	*(9.15)*	*(5.54)*
Number of countries	50	50	50
R^2 (adj.)	0.252	0.733	0.728

Notes: The dependent variable is average annual growth rate in GDP per capita, 1960–2000. Regressions include a constant. Test scores are an average of math and science, primary through end of secondary school, all years. The t-statistics are in parentheses.
Source: Hanushek and Woessmann (2012).

The impact of alternative measures of human capital can be seen in the long-run growth models displayed in table 2.2. The table presents simple models of long-run growth, *g*, over the period 1960–2000 for the set of 50 countries with required data on growth, school attainment, and achievement (see Hanushek and Woessmann 2012). The first column relates growth to initial levels of gross domestic product per capita (GDP) and to human capital as measured by school attainment.[10] This basic model shows a significant relationship between school attainment and growth and explains one-quarter of the international variation in growth rates. The second column substitutes the direct measure of skills derived from international math and science tests for school attainment. Not only is there a significant relationship with growth, but this simple model now explains three-quarters of the variance in growth rates. The final column includes both measures of human capital. Importantly, once direct assessments of skills are included, school attainment is not significantly related to growth, and the coefficient on school attainment is very close to zero.

These models do not say that schooling is worthless. They do say, however, that only the portion of schooling that is directly related to skills has any impact on cross-country differences in growth. The importance of skills, and conversely

10. The inclusion of initial income levels for countries is quite standard in this literature. The typical interpretation is that this permits "catch-up" growth, reflecting the fact that countries starting from behind can grow rapidly simply by copying the existing technologies in other countries, while more advanced countries must develop new technologies. Estimating models in this form permits some assessment of the differences between the endogenous and neoclassical growth models discussed previously (see Hanushek and Woessmann 2011b).

the unimportance of schooling that does not produce higher levels of skills, has a direct bearing on human capital policies for developing countries.

A causal interpretation of such models is of course open to question because of potential issues of reverse causation, omitted variables, and measurement errors. Hanushek and Woessmann (2012) show that the most important such concerns about causation are unlikely to be producing these results. Nonetheless, it is impossible to rule out all such issues conclusively.

Finally, the estimated impacts of cognitive skills on growth are very large. The cognitive skills measure is scaled to standard deviations of achievement. Thus, a difference of one standard deviation in performance equates to 2 percent per year in average annual growth of GDP per capita.

The Distribution of Skills

The prior discussion of the importance of skills and human capital for both individuals and the aggregate economy is included largely to permit assessing some of the important distributional issues in U.S. society. There are, of course, many different dimensions of distribution that could be considered—race, ethnicity, or poverty—and they all interact strongly with location. With sufficient data, one could decompose the distribution of skills on all of these dimensions simultaneously. Unfortunately, it is not easy to trace the data in each of the multiple cells, but in the current analysis it is not essential because of the overlay of location on the distribution of black and Hispanic students.[11]

The standard accounting for individual skills is arraying school attainment across the population. This is natural, both because of the ready availability of data on years of schooling and because of the power of the Mincer earnings functions to trace labor market differences.

In the aggregate, the United States has seen some convergence over time in school attainment by race and ethnicity. As shown in table 2.3 for people ages 25–29, there has been a convergence over the past two decades in high school completion between whites and both blacks and Hispanics.[12]

Yet the schooling statistics also show another distributional trend: completion of college has significantly diverged between whites and both blacks and Hispanics. This trend is particularly important given the rapid rise in labor market

11. While there has been recent attention to issues of income distribution (see, e.g., Reardon 2011), there is little consistent data on education by income. Moreover, as is widely known, income is distributed much more broadly across location than is race.

12. Heckman and Lafontaine (2010) have argued that the apparent rise in completion and convergence is largely a result of measurement issues—most important, the inclusion of high school completion certificates earned by passing the tests of the General Educational Development (GED). More recently, Murnane (2013) has argued that completion has actually risen in the first decade of the twenty-first century, particularly among blacks and Hispanics.

Table 2.3
School Attainment by Race and Ethnicity, Ages 25–29, 1980–2012 (%)

	1980	1990	2000	2012
		High School Completion and Above		
All	85.4	85.7	88.1	89.7
White	89.2	90.1	94.0	94.6
Black	76.7	81.7	86.8	88.5
Hispanic	58.0	58.2	62.8	75.0
		Bachelor's Degree or More		
All	22.5	23.2	29.1	33.5
White	25.0	26.4	34.0	39.8
Black	11.6	13.4	17.8	23.2
Hispanic	7.7	8.1	9.7	14.8

Source: U.S. Department of Education (2013).

returns to completion of college over the past two decades.[13] With the growth in the value of higher education, this differential rise in college attendance is not altogether surprising given the divergence of preparation for college.

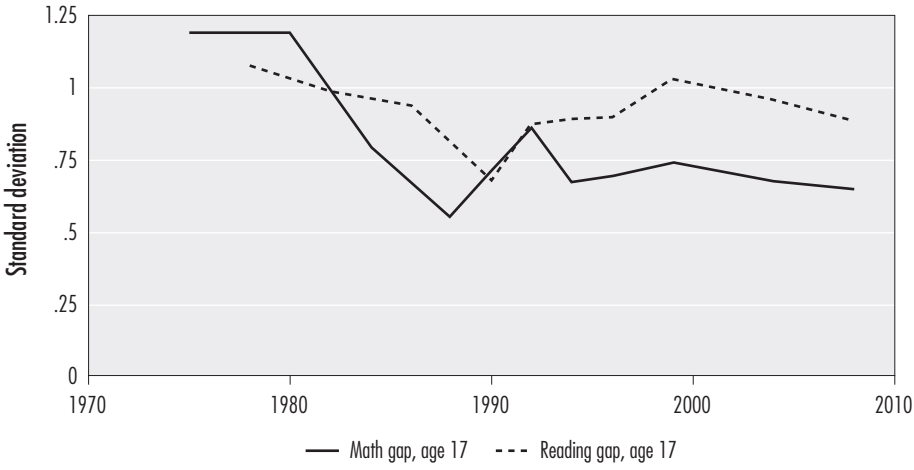
It is important, however, to emphasize the differences that are observed in student achievement as measured by math and reading scores. The National Assessment of Educational Progress (NAEP) provides a historical picture of the development of achievement. These differences are an indication of variations in human capital by race, and they clearly add another dimension to the attainment picture.

The gaps in achievement are truly stunning. While there has been some historical movement in closing the gaps, particularly in the 1980s, the current differences are enormous.[14] Figures 2.1 and 2.2 show the magnitude of racial differences in achievement in math and reading in standard deviations. The black-white gap of 0.86 standard deviation in math in the latest observation places the average black in the 19th percentile of the white distribution. The Hispanic-white gap of 0.69 standard deviation places the average Hispanic in the 26th percentile of the white distribution.

13. For a recent review, see Oreopoulos and Petronijevic (2013).

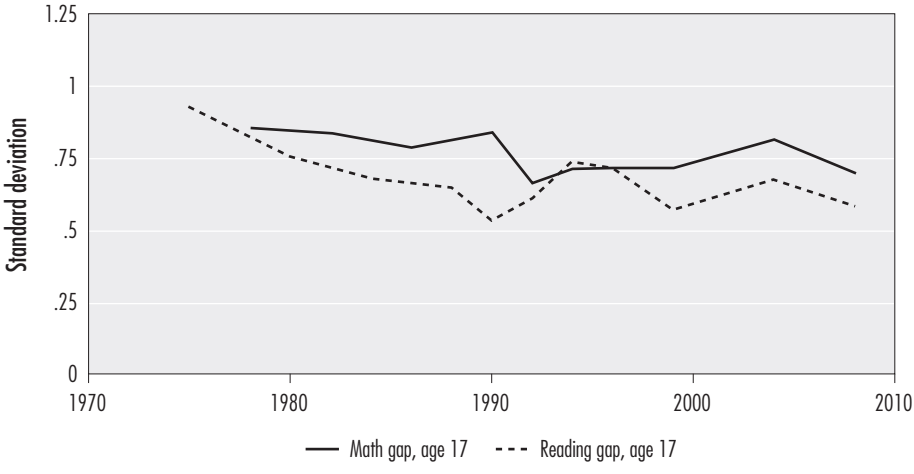
14. It has been speculated that the time pattern can be best understood in terms of the pattern of school desegregation in the United States (Hanushek 2001). This chapter will return to this idea later in light of evidence on achievement.

Figure 2.1
Black-White Achievement Gap, 1975–2008



Note: Gaps refer to the National Assessment of Educational Progress (NAEP) for 17-year-olds using the long-term trends data.
Source: http://nces.ed.gov/nationsreportcard/naepdata/.

Figure 2.2
Hispanic-White Achievement Gap, 1975–2008



Note: Gaps refer to the National Assessment of Educational Progress (NAEP) for 17-year-olds using the long-term trends data.
Source: http://nces.ed.gov/nationsreportcard/naepdata/.

The prior analysis of the economic impacts of cognitive skills provides some indication of the cost of these gaps to the individuals involved. The direct loss of income for the average black worker is roughly 13 percent each year (i.e., 0.15×0.86 where 0.15 is the average return to skills from table 2.1) over his or her entire work life. The comparable figure for a Hispanic worker is 10 percent.

These calculations are not really the full cost of the worker's low skills. Low achievement implies lower school attainment. The estimates above are what would obtain, holding schooling constant. But we really need to look at the total cost of low achievement. Murnane and colleagues (2000) suggest that the return rises by 50 percent when the indirect effects are combined with the direct effects of achievement.[15]

The alternative way to view this is from the perspective of economic growth. If we look at the gaps for eighth-grade NAEP math achievement, bringing black and Hispanic students to the level of whites would increase overall U.S. average performance by 0.29 standard deviation. The economic gain, resulting from the previously described impact on economic growth, would be enormous. If policies that closed the gaps were pursued over a 20-year period, the present value of gains to GDP over the next 80 years (the life expectancy of someone born today) would be $50.8 trillion.[16] This gain is more than three times the current GDP. Put differently, the average GDP with the gaps closing would be 7 percent higher over the entire 21st century than if no improvements in achievement were pursued.

The current debates about the future fiscal problems facing the United States have largely been about taxes and expenditures. But improvements in the growth rate of GDP such as those projected here from improved schooling could dramatically alleviate the country's fiscal problems. Moreover, since these problems are ones of long-run balance, the timing of returns to investment in improved schooling would match, since the gains from better schooling would accrue only after the students entered the labor market.[17]

Race, Schooling, and Location

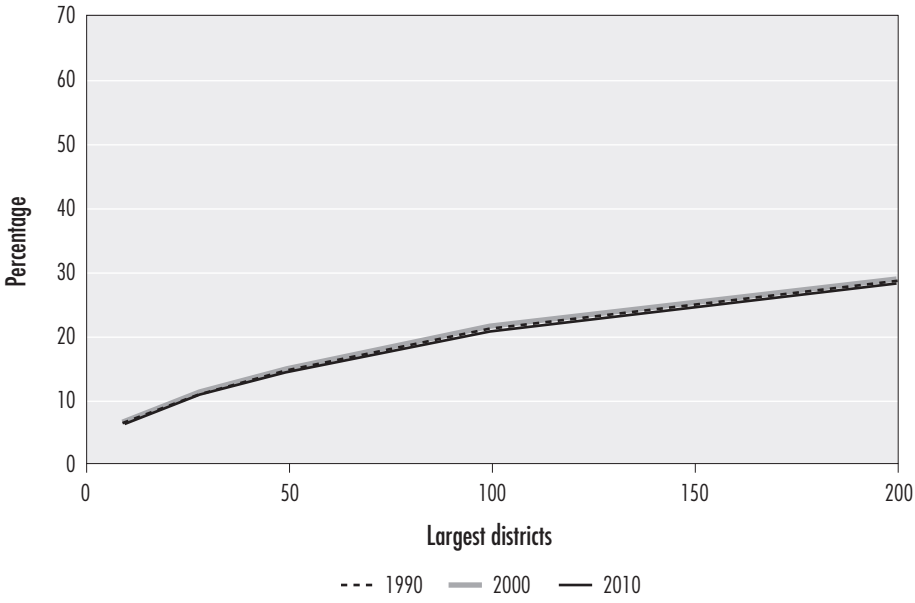
What do we know about the causes of these disparities, and what can we do to ameliorate them and the economic losses?

15. Neal and Johnson (1996) similarly looked at the total impact of skills (including that coming from added school attainment) to understand the lasting effects of early achievement differences.

16. These projections are based on Hanushek and Woessmann (2011b). They assumed that historical growth patterns will hold in the future and that the impact of achievement on growth depends on the average achievement of the working population. Future returns are discounted at 3 percent.

17. For more on this topic, see Hanushek, Peterson, and Woessmann (2013).

Figure 2.3a
Cumulative Distribution of the Proportion of All Students by District Size Rank, 1990, 2000, and 2010



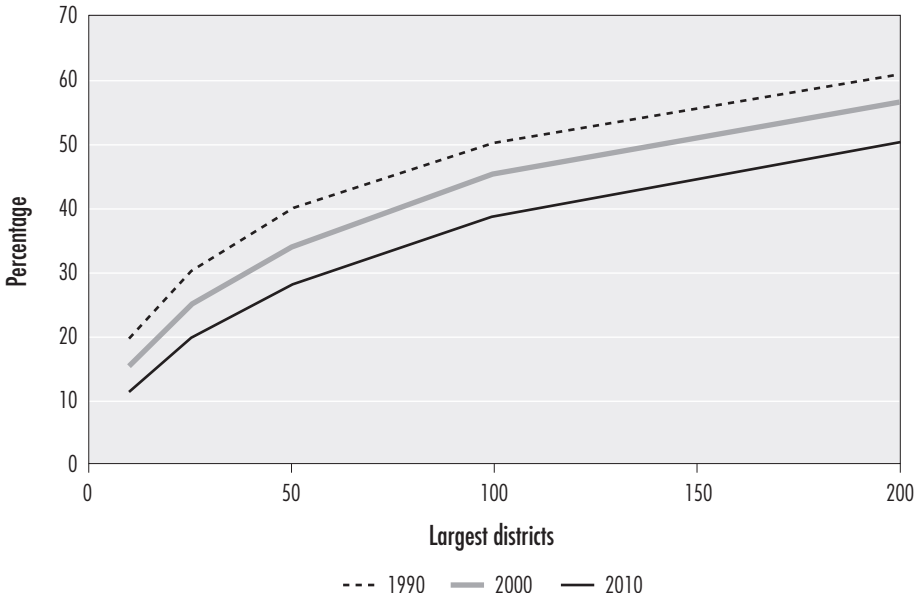
Source: Calculations based on the Common Core of Data, National Center for Education Statistics, http://nces.ed.gov/ccd/ccddata.asp.

With the data on outcomes, researchers are immediately drawn to issues of urban school quality. While there are over 14,000 school districts in the United States, the largest districts have a disproportionate number of students. Overall, as seen in figure 2.3a, 10 percent of all students are found in the largest 25 districts, and nearly 30 percent are found in the largest 200 districts.

However, the concentration of minority students is much greater. Figures 2.3b (blacks) and 2.3c (Hispanics) show that the urban concentration of these populations has fallen over the past two decades for both blacks and Hispanics, but it still remains very high. Specifically, while 60 percent of both blacks and Hispanics attended school in the top 200 districts in 1990, this proportion fell to 50 percent in 2010. Nonetheless, minorities are heavily concentrated in large city schools. One-fifth of blacks and Hispanics are still found in the largest 25 school districts.

Further, achievement in both reading and math is systematically lower in city districts as opposed to suburban districts. NAEP scores for 17-year-olds vary a little by region of the country, but much less than by city versus suburb. The differences in NAEP scores between city and suburb in 2008 were, however, considerably smaller than the racial gaps: roughly 0.3 standard deviation for math and 0.2 standard deviation for reading.

Figure 2.3b
Cumulative Distribution of the Proportion of Black Students by District Size Rank, 1990, 2000, and 2010



Source: Calculations based on the Common Core of Data, National Center for Education Statistics, http://nces.ed.gov/ccd/ccddata.asp.

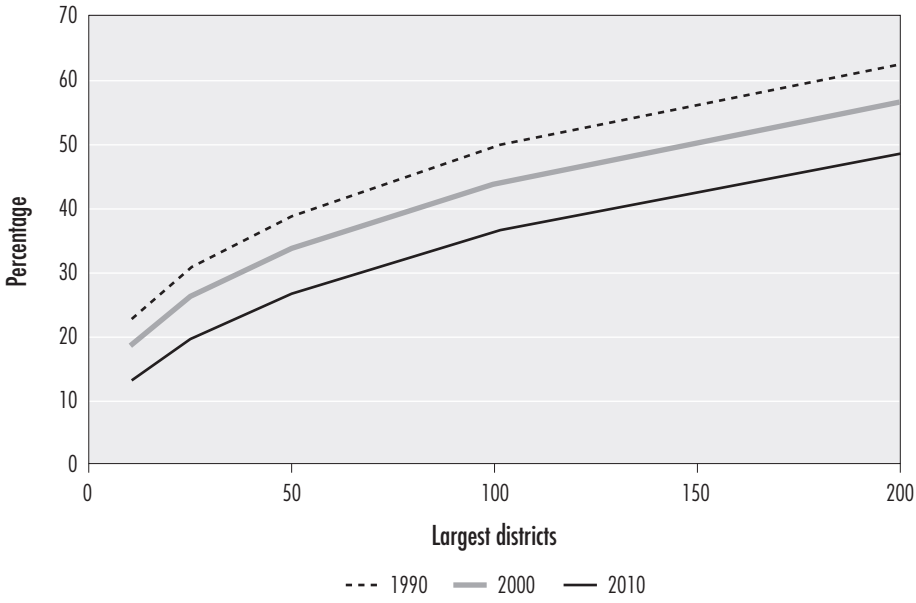
Two issues arise as we move along this locational path. First, how much of the gaps in achievement by race and ethnicity is a result of lower-quality schools, particularly urban schools? Second, what is the role of schools in ameliorating these gaps?

Considerable research has been directed at decomposing achievement differences according to different inputs. Indeed, one of the first efforts to understand racial differences in achievement was the Coleman Report, issued in 1966 in response to the Civil Rights Act of 1964 (Coleman et al. 1966). This report was widely interpreted as concluding that families were the most important influence on student achievement, followed by school peers; schools had little influence. By this analysis, we should probably not attribute much of the racial gap in achievement to urban school districts.

But the analysis was heavily criticized for a variety of analytical reasons (Bowles and Levin 1968; Cain and Watts 1970; Hanushek and Kain 1972). Overwhelmingly important for the purposes here, however, is that it did not have good measures of differences in school quality. Indeed, subsequent attempts to sort out families, schools, and peers have foundered on similar problems.

Much of the interpretation of differences in school quality by location relates directly to assumptions about funding differences. It is generally observed (and

Figure 2.3c
Cumulative Distribution of the Proportion of Hispanic Students by District Size Rank, 1990, 2000, and 2010



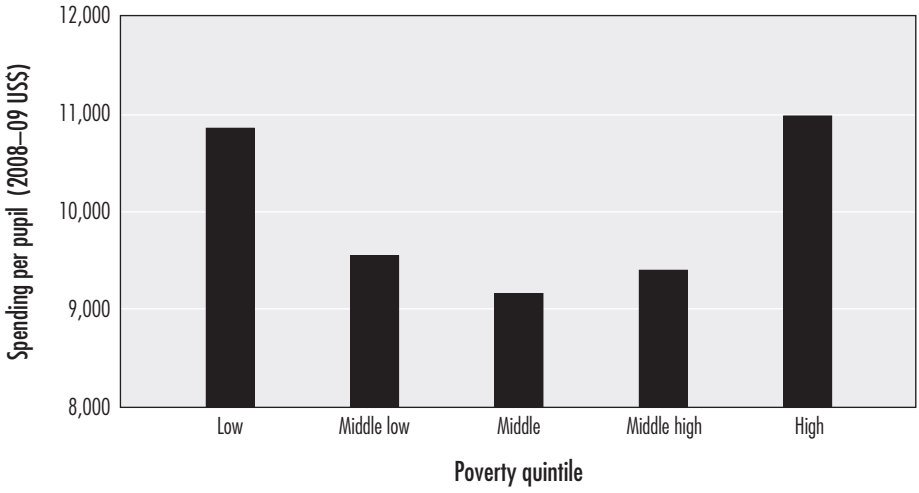
Source: Calculations based on the Common Core of Data, National Center for Education Statistics, http://nces.ed.gov/ccd/ccddata.asp.

true) that a number of the highest-spending school districts are suburban districts, leading many to conclude that spending must be a source of achievement differences. Indeed, a large number of school finance suits have been argued on this very presumption.[18] The problem with this argument is twofold. First, the basic facts are not correct. As shown in figure 2.4, if schools are divided into quintiles by concentration of poverty, the highest spending is found in schools with the most poverty.[19] The second-highest spending is in schools with the least poverty—that is, rich suburban schools. Second, and more important, spending is not closely related to achievement (Hanushek 2003). Differences in spending, even if more closely related to locational patterns, do not provide an explanation of the achievement gaps.

18. See the review and discussion in Hanushek and Lindseth (2009).

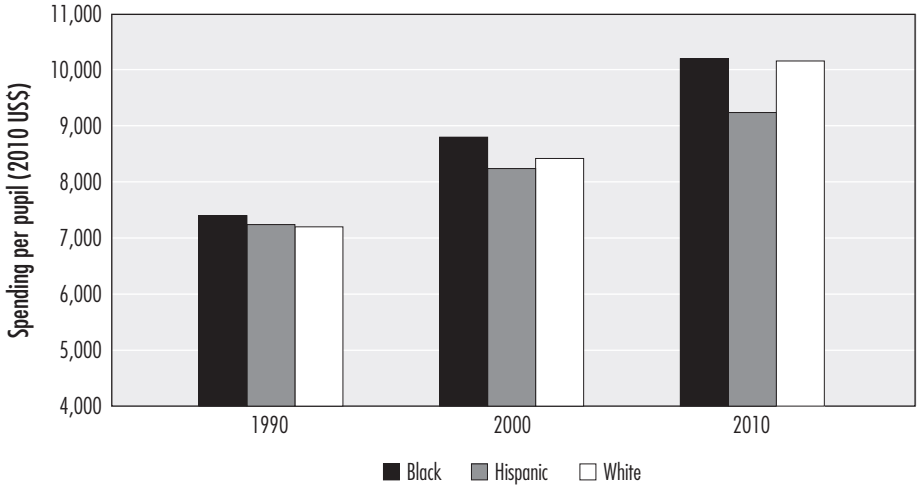
19. A portion of the extra expenditure in high-poverty schools could reflect categorical funding of programs for students with special needs or limited English skills. Indeed, both the federal government and most states provide extra funding for these programs. Nonetheless, general spending patterns would not be affected by this funding.

Figure 2.4
Spending per Pupil by School District Poverty, 2006–2007



Source: National Center for Education Statistics (2010a), table 36-1.

Figure 2.5
Real Spending per Pupil by Race, 1990, 2000, and 2010



Source: Author's calculations from Common Core of Data, U.S. Department of Education, http://nces.ed.gov/ccd/.

Similarly, figure 2.5 shows spending by race between 1990 and 2010. While a gap opened up between white and Hispanic students by 2010, spending on the schools of black students has consistently exceeded that for white students.

None of this, of course, says that schools are unimportant in determining achievement. What it does say is that common measures of school quality—spending or other characteristics such as class size or teacher degrees—are not closely related to achievement. As discussed later in this chapter, however, variations in teacher effectiveness are important, reinforcing the general presumption that schools have a strong impact on students. The classic input measures of teacher quality, however, are not very useful.

In reality, the whole question of decomposing the underlying causes of the achievement gaps is quite hopeless given our current knowledge. We know that student achievement is strongly related to family background, but little attention has been given to how family background should be measured if looking for the causal structure. By income? Parental education? Family structure?

And despite the effort expended on attempting to answer this basic question of the sources of achievement differences, it is far from clear why this is such an important question. It is clear that the United States would like to eliminate the racial and ethnic gaps in achievement, both because of equity goals and because of the impact of unfulfilled human capital on individual and aggregate income. But evaluating policies to do so is not obviously helped by knowing the causes of the existing gaps. Take, for example, an extreme where the gaps arise entirely from education within the family. Knowing this would not lead society to focus just on policies to change education in the home, as Americans are generally reluctant to interfere in the family, and policy makers do not know much about how they could change education in the home if they wanted to.

Some Selected Achievement Factors

The research on the determinants of achievement has progressed quite far in the past two decades. Researchers have been able to exploit new data sources largely, though not exclusively, developed from administrative records of schools. The details of this work obviously go beyond the scope of this chapter, but there are three strands of the work that I want to emphasize: the impact of racial concentration in schools, the importance of teacher and principal quality, and the role of early childhood education.

RACIAL CONCENTRATION

Racial concentration in schools has a long history that is thoroughly intertwined with locational questions. The de jure segregation of schools that was the focus of the U.S. Supreme Court in its 1954 decision in *Brown v. Board of Education*[20]

20. *Brown v. Board of Education*, 347 U.S. 483 (1954).

has followed a tortured path through the courts and through public policy making. Interestingly, strong evidence on the educational impact of racial concentration has very recently become available, just as the courts have moved away from policies aimed at eliminating racial concentration in schools.

The only social science evidence of harm from school segregation cited by the U.S. Supreme Court in *Brown* involved psychological studies of black children relating low self-esteem to segregated schooling.[21] Most early post-*Brown* analyses focused on short-run effects of purposefully moving students to eliminate racial concentration, including the effects of desegregation on achievement, self-esteem, and racial attitudes (Armor 1995; Cook 1984; Crain and Mahard 1978). More recently, Guryan (2004) examined the impact of school desegregation on the probability of dropping out of high school.

The research most directly related to questions of how racial concentration relates to achievement gaps focuses on whether peer racial composition, as opposed to desegregation actions per se, affects the achievement of blacks and other demographic groups. The Coleman Report, officially titled *Equality of Educational Opportunity* (Coleman et al. 1966), and its offshoot, *Racial Isolation in the Public Schools* (U.S. Commission on Civil Rights 1967), provided early empirical evidence that racial isolation harms academic achievement, although Armor (1972) raised questions about the findings. Subsequent work by Boozer, Krueger, and Wolkon (1992); Crain (1970); Grogger (1996); Hanushek (1972); Hanushek and Raymond (2005); and Hoxby (2000) also found that school racial composition affects academic, social, and economic outcomes of students. An investigation of racial peer influences by Angrist and Lang (2004) exploited the potential impacts of the Massachusetts voluntary interdistrict integration program (Metco) on students in the receiving districts. They found little evidence that white students in those districts were affected by blacks entering through the Metco program, although black students in the districts appeared to be more sensitive to the influx of lower-achieving blacks.

On the other side, Rivkin (2000) found no evidence that exposure to whites increased academic attainment or earnings for black men or women in the high school class of 1982; Card and Rothstein (2007) found that neighborhood but not school racial composition affected achievement; and Cook and Evans (2000) reported that little of the black-white difference in NAEP scores can be attributed to racial concentration. The difficulty of isolating exogenous variation in racial composition likely has contributed to the disparate findings.

Perhaps the clearest evidence regarding racial concentration can be found in Hanushek, Kain, and Rivkin (2009), who studied students in Texas. The authors used the stacked panel data on student achievement to isolate the impact of racial concentration. Their empirical analysis shows that the black enrollment share

21. Footnote 11 in *Brown* refers to the doll studies of Kenneth and Mamie Clark (Clark and Clark 1939), which found that blacks in the segregated South tended to identify with white dolls and not black dolls.

adversely affects achievement and that the effects are roughly twice as large for blacks as for whites. The pattern of results strongly suggests that racial composition does not serve as a proxy for school quality and that peer academic preparation accounts for only a small portion of the racial composition effect, leaving the precise causal links that underlie the relationship between achievement and racial composition uncertain. The key component of racial composition is the black enrollment share, with concentrations of other minority groups, notably Hispanics, exerting a much smaller effect that is not significantly different from zero in most specifications. Additionally, while there is some uncertainty, racial or ethnic concentration does not appear to affect Hispanic achievement.

The magnitude of the estimates in this study suggests that the elimination of all differences in the black enrollment share in Texas public schools for just grades 5–7 (corresponding to the authors' observation period) would close over 10 percent of the seventh-grade black-white test score gap (moving from 0.7 to 0.6 standard deviation).[22] The average black student in Texas has 39 percent classmates who are black, while the average white student has 9 percent black classmates. The reduction of a 30 percentage point difference in school proportion black between black and white students is a sizable change that would likely involve involuntary student movements and might well alter the relationship between achievement and proportion black estimated from the existing distributions of blacks and whites. Moreover, a majority of the uneven distributions of blacks and whites in the schools comes from racial differences in residential patterns between districts and not from attendance patterns within districts, thus limiting the scope of policy actions.

In an extension of this analysis, Hanushek and Rivkin (2009) showed that the harmful effects of racial concentration are most severe for blacks in the top quartile of the ability distribution. This fact clearly enters into the previous discussion of an increasing college completion gap between blacks and whites.

TEACHER AND PRINCIPAL QUALITY

Perhaps the strongest and most consistent finding of recent research is the importance of teacher quality in student achievement. The early work on teacher quality focused on measurable characteristics and background factors such as experience or type of training. The subsequent failure of observed teacher characteristics, including education and experience, to account for much of the variation in student test scores or other outcomes presented researchers with a conundrum. Although the absence of a strong relationship between outcomes and these characteristics is consistent with teacher quality not being an important determinant of learning, it is also consistent with the possibility that these quantifiable characteristics are simply poor measures of teacher effectiveness.

22. If the impact of racial composition held for all earlier grades, the comparable closing of the gap for an even distribution of blacks in grades 1–7 would be even larger.

The analysis of teacher effectiveness has largely turned away from attempts to identify specific characteristics of teachers. Instead, attention has focused directly on the relationship between teachers and student outcomes. This outcome-based perspective, now commonly called "value-added analysis," takes the perspective that a good teacher is simply one who consistently gets higher achievement from students (after allowing for other impacts on student achievement levels, such as family influences or prior teachers). The underlying analysis has focused on statistical estimation that separates teacher influences from other factors, and most typically it has relied on administrative data from schools.

Recent outcome-based estimates have found substantial variation in teacher contributions to student achievement, supporting the interpretation that the earlier work simply had poor measures of teacher quality. Using administrative databases, some covering all the teachers in a state, such research provides strong support for the existence of substantial differences in teacher effectiveness, even within schools.[23] Although this approach circumvents the need to identify specific teacher characteristics related to quality, the less parametric approach introduces additional complications and has sparked an active debate on the measurement and subsequent policy use of estimated teacher value added.[24]

Table 2.4 summarizes existing estimates of the standard deviations of teacher effectiveness expressed in units of student achievement (normalized to a standard deviation of one). Though covering a range of schooling environments across the United States, these studies produced fairly similar estimates of the variance in teacher value added: the average standard deviation for reading is 0.13 and for math 0.17, and the distributions for both are fairly tight. Note that these estimates rely only on within-school variation in value added, ignoring the surprisingly small between-school component. The between-school component is not typically considered because of potential sorting, testing, and other interpretative problems.[25]

The magnitudes of these estimates support the belief that teacher quality is an extremely important determinant of school quality and achievement. For example, the math results imply that having a teacher in the 25th percentile of the quality distribution as compared to the 75th percentile would mean a difference in learning gains of roughly 0.2 standard deviation in a single year. This would move a student at the middle of the achievement distribution to the 58th percen-

23. The earliest academic research in this area includes Armor and colleagues (1976), Hanushek (1971), and Murnane (1975). Policy interest rose with the introduction of the ideas directly into teacher evaluations of both states and districts (Sanders and Horn 1994). Student performance was directly linked to teachers and used both to counsel and to evaluate individual teachers.

24. A review of the analytical issues can be found in Hanushek and Rivkin (2012).

25. The study by Kane and Staiger (2008) is the one exception that did not exclude the between-school component. Hanushek and Rivkin (2010a) provide estimates of the within- and between-school variation in value added under different specifications.

Table 2.4
The Distribution of Teacher Effectiveness (standard deviations of student achievement)

		Teacher Effectiveness	
Study	Location	Reading	Math
Rockoff (2004)	New Jersey	0.10	0.11
Nye, Konstantopoulos, and Hedges (2004)	Tennessee	0.07	0.13
Rivkin, Hanushek, and Kain (2005)	Texas	0.15	0.11
Aaronson, Barrow, and Sander (2007)	Chicago	—	0.13
Kane, Rockoff, and Staiger (2008)	New York City	0.08	0.11
Jacob and Lefgren (2008)	Midwest city	0.12	0.26
Kane and Staiger (2008)	Los Angeles	0.18	0.22
Koedel and Betts (2011)	San Diego	—	0.23
Rothstein (2009)	North Carolina	0.11	—
Hanushek and Rivkin (2010a)	Texas city	—	0.11
Average		0.13	0.17

Note: All estimates indicate the standard deviation of teacher effectiveness in terms of student achievement standardized to mean zero and variance one. All are corrected for test measurement error. All except Kane and Staiger (2008) used within-school estimators.
Source: Hanushek and Rivkin (2010b).

tile. The magnitude of such an effect would be large relative to the typical measures of black-white or Hispanic-white achievement gaps previously described.

This analysis also fits into the locational theme of the current discussion. There has been considerable analysis of the distribution of teachers across schools. In particular, many schools with concentrated poverty—significantly found in central city school districts—find it difficult to retain teachers. Teachers often show a preference for moving to other, less disadvantaged schools, and contracts often permit more senior teachers to do this (Boyd et al. 2005; Hanushek, Kain, and Rivkin 2004).

The missing element of these early studies was information about the quality of teachers. On this there is less extensive research. On one hand, Hanushek and colleagues (2005) and Goldhaber, Gross, and Player (2011) found that the teachers leaving more disadvantaged schools did not tend to be the least effective. On the other hand, Sass and colleagues (2012) found teachers from both tails of the quality distribution are more likely to exit teaching, and Hahnel and Jackson (2012) found that teachers in the most disadvantaged schools in Los Angeles were less effective than the typical teacher found in less disadvantaged schools.

Finally, new research suggests that principal effectiveness is also a very important factor in student achievement. The impact of principal quality is very large and is most important in schools serving disadvantaged populations (Branch,

Hanushek, and Rivkin 2012). Moreover, schools serving more disadvantaged populations tend to have less effective principals, a factor contributing to worse working conditions and undoubtedly influencing higher teacher turnover.

EARLY CHILDHOOD EDUCATION

A recent focus of policy discussions has been preschool education. Various types of preschool education, such as universal and means tested, are frequently mentioned as the next "obvious" fix for the current schooling problems, particularly for disadvantaged students, who come to school far behind their middle-class peers in language and other skills.

There are three arguments for why the broad provision of preschool education is a good idea. First, the problems of disadvantaged children upon entry into school have received increased attention, particularly with the availability of new longitudinal data for early childhood.[26] The deficits in preparation of disadvantaged children are significant. For example, in evaluating the vocabulary of disadvantaged children, Hart and Risley (1995) found that they were exposed to dramatically less vocabulary. More-advantaged three-year-olds had vocabularies that were four times as large as disadvantaged three-year-olds. Moreover, the quality of parent-child communication was vastly different. These differences in preparation have potentially lasting effects on student outcomes, as schools have on average been unable to close the gaps.

Second, a variety of conceptual arguments for early investments in human capital, most notably by James Heckman and his colleagues, have received scholarly and policy attention. In a series of articles, these authors have argued that early investments are critical, since "learning begets learning" (Cunha et al. 2006, 698; see also Carneiro and Heckman 2003; Cunha and Heckman 2007; Heckman 2006; Heckman and Masterov 2007). Investments made early in life enhance learning later in school, and even into careers, making such investments attractive.

Third, key studies with strong research designs have supported the efficacy of preschool education. The most well known is the Perry Preschool Project, but others, such as the Abecedarian Project and the Early Training Program, also provide important evidence (Campbell and Ramey 1995; Campbell et al. 2001; Schweinhart et al. 2005; Witte 2007).[27] A set of benefit-cost analyses of the Perry Preschool Project shows that this appears to have been an effective program that was worth the expenditure (Barnett 1992; Belfield et al. 2006; Galinsky 2006; Gramlich 1986).

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26. See the description of the three panels created under the Early Childhood Longitudinal Study (ECLS) program at http://nces.ed.gov/ecls.

27. A comprehensive description and evaluation of different preschool programs can be found in Besharov and colleagues (2011).

For these reasons, it is natural that discussions of preschool enter into the educational policy debate and into judicial proceedings and judgments,[28] but questions have also been raised concerning the interpretation of the underlying evaluations and whether the results have general application. It is not possible to go through the evidence and debates in any detail here.[29] Importantly, however, the results differed across programs, so it is not possible simply to refer to "preschool," but rather it is necessary to identify the precise kind of program.

These demonstration programs were not your typical community- or school-based programs found in most states. The Perry Preschool Project, estimated to cost over $15,000 per child per year (in 2000 dollars), involved intensive treatment by teachers with master's degrees in child development, student-teacher ratios of 6 to 1, and regular home visits.[30] The Abecedarian Project was all day, five days per week, fifty weeks per year for five years beginning at birth and included medical care and intensive home visits (Campbell and Ramey 1995). It is estimated to have cost $76,000 per child (in 2002 dollars).

In 2005, throughout the United States, 70 percent of the four- and five-year-olds who were not in kindergarten were in center-based care arrangements that averaged 27 hours per week (National Center for Education Statistics 2010b, table 44). Indeed, for all children ages 0–5, blacks (36 percent) and Hispanics (29 percent) were more likely than whites (27 percent) to be in a center-based program. (The differences largely reflected differential participation in Head Start programs.) Thus, preschool programs have already reached large portions of the young population.

In sum, there are reasons to be favorably disposed to instituting expanded preschool programs for disadvantaged students, but there are also potentially huge costs and problems associated with doing it right. The idea has been to supplement what goes on in the home in order to provide stronger educational development. Such preschool investments recognize that it is easier to remediate earlier rather than later. At the same time, the educational outcomes of existing programs that have been evaluated, except perhaps the most intensive and

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28. For example, courts in South Carolina and New Jersey have found preschool education to be an essential element of an adequate education. See *Abbeville v. South Carolina*, Case No. 93-CP-31-0169 (Ct. Common Pleas, 3rd Jud. Cir., S.C., Dec. 29, 2005) (on appeal), and *Abbott v. Burke*, 172 N.J. 294, 798 A.2d 602 (N.J. 2002). Also see Hanushek and Lindseth (2009).

29. Moreover, even the beneficial results are quite varied. First, virtually all the positive programmatic results were for females, with male children primarily showing zero or negative impacts (Anderson 2008). Second, a substantial part of the beneficial impacts were found outside of schools and the development of cognitive skills. In particular, a substantial portion of the benefits found for females related to reduced criminal behavior. Differences in criminal activity were particularly important in the benefit-cost analyses (Gramlich 1986). Females did, nonetheless, generally have positive school completion results (Anderson 2008).

30. Cost estimates and programmatic comparisons can be found in Witte (2007).

expensive, have been small and short-lived. The limited number of models that have been evaluated provides uncertain guidance about the design of effective programs.

Policies for Dealing with Achievement Gaps

A wide variety of policies with locational implications have been suggested to deal with achievement gaps. Building on the prior discussions, this section reviews the prospects for a series of major policy interventions.

ADDRESSING RACIAL CONCENTRATIONS

Reducing racial concentrations in the schools in order to lessen the impact of peer composition seems obvious in many ways but is nonetheless problematic. The recent U.S. Supreme Court decisions concerning schools in Seattle and Louisville, following a long period of movement away from active policies aimed at school desegregation, severely limited the use of race-based considerations in the assignment of students to schools.[31] As a result, proxies for race distribution, such as family income, have been proposed. But while there are differences across metropolitan areas, this approach does not seem to be a generally powerful alternative to reducing racial concentration within districts (Reardon, Yun, and Kurlaender 2006).

Nonetheless, this focus on within-district policies is a bit of a red herring. As Rivkin and Welch (2006) reported, housing patterns across jurisdictions account for the bulk of school segregation, and prior court decisions limit interdistrict desegregation programs.[32]

The implication is that even though specific school and peer factors that systematically affect racial achievement gaps have been identified, policies directed at just those factors are unlikely to be very successful. Instead, it appears that a more comprehensive set of policies aimed at improving the quality of schools attended by blacks is required.

EVALUATIONS AND DIRECT PERFORMANCE INCENTIVES

Given the overwhelming importance of variations in teacher and principal quality, it is obvious that improving incentives to retain the best teachers and eliminate the worst are appealing. The best teachers add value to student incomes later in life in the hundreds of thousands of dollars, while the worst teachers subtract equal value (Chetty, Friedman, and Rockoff 2011; Hanushek 2011).

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31. See *Crystal D. Meredith v. Jefferson County Board of Education*, U.S. Supreme Court, Docket No. 05-915, and *Parents Involved in Community Schools v. Seattle School District*, U.S. Supreme Court, Docket No. 05-908, and the discussion in Linn and Welner (2007).

32. See *Milliken v. Bradley*, 418 U.S. 717, 744–746 (1974); *Missouri v. Jenkins*, 515 U.S. 70 (1995).

Obviously, if the quality of teachers working with minority students can be raised, it would help reduce achievement gaps. Yet the precise mechanisms of how to increase teacher quality are unclear.

Teachers are currently paid according to experience and education (i.e., holding an advanced degree), neither of which is closely related to classroom effectiveness. The argument has long been made that in order to provide incentives for teachers to do better, at least a portion of their pay should reflect merit. This idea led to a somewhat ill-conceived experiment by Vanderbilt researchers in which a randomly selected group of teachers received bonuses based on their students' performance (Springer et al. 2010). When compared to the students of teachers not offered bonuses, the students of those with the possibility of receiving performance pay did no better. This study demonstrated that offering a bonus for better performance to existing teachers has very little influence on the quality of their teaching. This is exactly what has been shown by the many studies that have focused on the impact of relatively small bonuses on current teachers' performance in the classroom. The simplest interpretation is that almost all current teachers are trying to do the best they can.

At the same time, this does not demonstrate that salaries have no effect. Both the level of salaries and the pattern of salaries across teachers affect who enters and who stays in the profession. Higher salaries and a greater relationship to performance would attract a different group of people into teaching. Indeed, for researchers and policy makers who think that performance pay is important, the impacts of the level and pattern of salaries on entry into teaching and on retention in teaching are the key issues.

Nonetheless, the Vanderbilt "gold standard" study that used random assignment methods has allowed unions and schools to argue that performance pay does not work. This situation demonstrates another issue in making evidence-based policy. It is often possible to find evidence to support very different positions, or interpret it in such a way. This problem makes moving to rational policy positions more difficult, particularly in personnel policy, where vested interests are especially important.

The movement toward better policy can be seen directly in state actions. For example, all states except California had unique student identifiers in 2011, and 35 states had unique teacher identifiers that allowed linking teachers to students (National Council on Teacher Quality 2012). Between 2009 and 2011, 26 states moved to include evidence of student learning in teacher evaluations, and 10 states mandated that student learning would be the preponderant criterion in local evaluations.

There has been considerable recent progress in teacher tenure decisions. More and more states are moving to require evidence of teacher effectiveness and to extend the minimum number of years in service for tenure. About a third of the states also support differential pay in shortage subject areas and do not have regulatory language blocking differential pay. Similarly, about a third of the states support differentially rewarding effective teachers. While there is still a

long way to go in expanding and refining these policies, the pattern of state policies regarding effective teachers has changed dramatically in recent years.

There is also a new sense of forward movement at the local level. Perhaps the best story comes from Washington, DC. This school district, by far the worst in the nation, witnessed agonizing battles between Michelle Rhee, chancellor of public schools from 2007 to 2010, and the teachers' union. In 2010, the two sides accepted a new contract that introduced both value-added and observational evaluations and that used them in personnel decisions. After the first three years, around 1,000 teachers received substantial increases in their base salaries because of continued top performance, and close to 350 teachers were dismissed because of continued poor performance. Moreover, Dee and Wyckoff (2013) find that the system had beneficial effects through adding to the retention of the best teachers and encouraging many low performers to leave the system. The district's evaluation system is continually being developed and improved, but it has reached a level of acceptance that bodes well for the future.

Similarly, the Los Angeles Unified School District has moved to remove around 100 poorly performing teachers. While this number remains small compared to the total number of teachers in Los Angeles, it is orders of magnitude larger than what was seen just a couple of years ago.

Many states and localities are developing what must be thought of as experimental programs for ensuring teacher quality. The key to the future is validating and replicating the ones that prove successful and eliminating the ones that do not.

EXPANDED PRESCHOOL

Almost certainly, an expanded preschool program would fit into a policy portfolio designed to deal with existing human capital gaps. The chief question, however, relates to design.

The United States does, in fact, have a large and existing public preschool program, introduced during the War on Poverty in 1965. Over 900,000 three- and four-year-olds from families in poverty are currently enrolled in Head Start programs around the country. The federal Head Start program is considerably different from the Perry and Abecedarian programs mentioned earlier in this chapter. In 2005, just 35 percent of its teachers had a bachelor's degree, and local programs varied considerably in length and intensity (Head Start Bureau 2005). The cost of Head Start is usually reported as slightly over $7,000 per pupil per year (in 2003–2004 dollars), derived by dividing total program costs by the number of participants. (In 2012, the average cost in current dollars would be roughly $8,000.) However, this calculation mixes together a variety of programs that are part time and part year. If run on a full-time, full-year basis, program costs would exceed $20,000 per year (Besharov, Myers, and Morrow 2007).

At the same time, support for the educational efficacy of Head Start is limited. The early education program in Head Start was complicated by its conflicting emphasis on local community employment activities, and initial evaluations

found little lasting impact on student achievement. At that time, Head Start was redefined as a health and nutrition program instead of an educational program. Subsequent evaluations have consistently found small achievement effects, which generally disappear relatively quickly.[33] In fact, the most recent evaluation of Head Start based on a random assignment design provided little evidence of the efficacy of the program (Puma et al. 2010).

Here is an obvious place for true experimentation. Researchers do not understand how different program characteristics with different associated costs enter into the quality of preschool programs. Nor do they understand how various financing elements would affect demand and outcomes. While not explicitly discussed, public programs would likely include some form of means testing, as there is no evidence that preschool programs affect outcomes for middle-class children. Yet little is known about either of these relationships.

EXPANDED SCHOOL CHOICE

Returning to the link between schooling and location, an obvious topic is expanded school choice. Starting with Friedman (1962), there has been consideration of vouchers and the expansion of school choice among both researchers and policy makers. A fundamental idea behind school choice is breaking the correspondence between residential location and school opportunities.

Over the past 20 years, there has been a slight decline in the aggregate proportions of students attending private schools, although there have been compositional changes, with a sharp decline in the importance of Catholic schools (National Center for Education Statistics 2012). But one of the largest changes in public schooling over the past two decades has been the widespread introduction of charter schools. The first charter schools appeared in Minnesota in 1991. In 2011, 4 percent of all U.S. students attended over 5,000 charter schools found in 43 states. Increases in charter school attendance have more than offset the declines in private school enrollment (1.7 percent), and in fact may have contributed to the private school decline.

Charter schools are quite varied in their mission, operations, and performance. They are all public schools that receive varying funding from state, local, federal, and philanthropic sources. The underlying ideas are that they provide an alternative to traditional public schools of the local school district and that they are demand driven—that is, they are dependent on having sufficient numbers of students enrolled to meet their expenses. Moreover, they must offer open enrollment and be nonselective, relying on admission lotteries when oversubscribed.

Charter schools have been identified as serving a variety of purposes. First, they are intended as ways of promoting innovation, since they can alter the approach, curriculum, and hiring patterns of traditional public schools. Second, they are designed to offer some amount of choice to parents and students over the

33. See, for example, the review in Vinovskis (1999).

schools they attend. Third, they are designed to provide competition to the traditional public schools, providing an incentive for the latter to improve. Fourth, they are frequently employed as a targeted educational reform solution for historically underserved students and communities.

Charter schools have had their clearest overall success in providing choice to families that have not found choosing schools easy or feasible. In particular, while middle-class families exercise considerable choice over the schools their children attend through residential location decisions, many other families, particularly those facing financial constraints, have more limited options. Charter schools disproportionately serve poor and minority clientele—precisely the population with more limited choice mechanisms.

There is limited evidence to date that the competition provided by charter schools has led to many significant improvements in traditional public schools. It is clear that the market share of charters alone is insufficient to create substantial competitive pressure in most markets. In part, however, the evidence on competition reflects the fact that a number of states and localities have insulated traditional public schools from competition that would lower their funding, thus eliminating many of the incentive aspects of charter schools.

The largest area of controversy has been about the impact of charter schools on student performance. The most reliable and representative studies (CREDO 2009, 2013) found a small average difference in achievement growth between charter schools and their corresponding traditional public schools, with large numbers of both very good and very bad charter schools. It does appear that the average performance of charter schools has improved over time, largely by eliminating the worst schools.

It is very difficult, however, to generalize conclusions about impact across states and districts, because there are both systematic differences in results and widely varying policies and practices. Indeed, it is becoming increasingly clear that there are wide differences in performance across charters and across states. On one hand, some of the very best schools, particularly those serving disadvantaged populations, are charter schools. In the large urban centers of New York and Boston, charters appear to have done very well. (For New York City, see CREDO 2010; for Boston, see Abdulkadiroğlu et al. 2011.) On the other hand, in other cities and states, many charters show poorer academic performance than the alternative traditional public schools that the students might attend.

There are many unknowns about the operation of charter schools. Why do charters in some states do so much better than those in other states? Why do badly performing schools still attract students? What is the role of funding and authorizer policies in the success of some schools?

From a larger perspective, it is difficult to understand the full impact of choice on the distribution and level of student outcomes. There is not any good counterfactual information with which to compare the current or expanded levels of choice. To address this issue, Nechyba (2000, 2003) developed an interesting set

of general equilibrium models for public goods that included alternative voucher arrangements.

Hanushek, Sarpça, and Yilmaz (2011) expanded on this general equilibrium approach by developing a model with a local economy with two school districts where households consider a trade-off between residential location and the provision of public schools. They introduce private schools that can be attended from any school district in order to divorce location from schooling options. Private schools have impacts on educational outcomes through three mechanisms. First, the private schools themselves may offer a superior education for those attending them. Second, private schools may affect the peer composition of both the public and private schools, and this may affect student achievement. Third, private schools may offer competition for students that induces improved performance by the public sector—seen in terms of better meeting the demands of parents or producing education more efficiently. A final element of the equation involves the fiscal implications of private school enrollment. The fundamental conclusions are quite clear: Having a larger opportunity set has benefits not only for households that select those alternatives but for others as well. Indeed, eliminating the private school option results in a disturbingly low quality of education in poorer neighborhoods.

RECONSIDERING SCHOOL FINANCE POLICY

One of the main features of the U.S. school system is the reliance on local tax and spending policies that follow distinct jurisdictional lines. Coupled with this, as noted previously, locational choice dictates divisions of the population along income, race, and ethnic lines. An obvious consideration is whether changing the financing or operation of local districts would eliminate the existing achievement gaps.

It is most natural to think of school finance policy as directly affecting the distribution of education outcomes. Unfortunately, the links are not very clear, because there is extensive evidence that performance is not consistently related to spending in schools.[34]

While there is a long history of court involvement in state school finance policies,[35] it has been difficult to judge the outcomes of any changes. First, it is hard to link funding changes mandated by the courts to school outcomes. Second, individuals react to changed incentives.

The provision of local public schools has been analyzed extensively within a Tiebout framework.[36] This work provides some strong conclusions about the

34. See the review of evidence in Hanushek (2003).

35. For a review of both the prior court cases and the outcomes, see Hanushek and Lindseth (2009).

36. See the review in Epple and Nechyba (2004).

demand for local public goods, but most of it does not consider the interaction with location. One attempt to model this has been a set of studies investigating the general equilibrium outcomes of altered finance policies (Hanushek, Sarpça, and Yilmaz 2011; Hanushek and Yilmaz 2007, 2013). These latter studies show that locational incentives and the reactions of individuals to finance policy lead to significant modification of the impacts of finance policies once behavioral adjustments are considered.

At the very least, after more than four decades of intense involvement by courts and legislatures, there is little discernible effect of school finance changes on either the level or distribution of school outcomes. This finding holds for both immediate achievement and longer-run income effects (Hanushek and Somers 2001).

Conclusions

When one considers the distribution of economic outcomes, it is impossible to ignore the role of schools in producing human capital. Individuals and the nation are highly dependent on the quality of the workforce, and the quality of the workforce is directly related to the achievement of students. Indeed, in the long run it appears that almost the only thing that matters is the skills of the population.[37]

But the United States delegates the responsibility for running its schools to local school districts. Each district, within the broad policy guidance of the separate states, makes the crucial decisions that dictate the quality of local schools.

The local school districts interact directly with locational patterns of the population. In particular, given the concentration of blacks and Hispanics in the largest school districts, a very small percentage of districts have dramatic leverage over the distribution of achievement and the subsequent economic rewards.

In recent decades, the achievement of black and Hispanic students has lagged behind the achievement of white students, implying a continuing income distribution problem. Moreover, the overall levels of performance in the United States have not matched those in other developed countries (Hanushek, Peterson, and Woessmann 2013). Eliminating achievement gaps and lifting the overall level would have dramatic implications for America in the future.

Is location fate? For the past several decades, minority students have been highly concentrated within a small number of urban districts, and those districts have not solved the problems of achievement. Location is fate if there are not significant policy changes. Available evidence suggests, however, that improvement is possible, albeit politically difficult.

37. For a broader discussion of this, see Hanushek, Peterson, and Woessmann (2013).

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